Code Drafting, Part 5: Message Drafting

The techniques described in previous articles on code drafting [1-4] allow a string to be embedded in a weave, thus memorializing that string.

The methods used, however, do not allow the string to be recovered from the weave. Many different strings can produced the same weave.

Consider Table 2 from the first article, adapted for alternating parity:

ABCDEF	1,2
GHIJKL	2,3
MNOPQR	3,3
STUVWXYZ	4,1

Using this table, the strings PARTY TIME and MARS TWINE, among many others, produce the same sequence:

3,2,3,4,1,4,3,4,1

In order for a code-drafted weave to convey a message that can be unambiguously recovered from the weave, it is necessary to associate a unique sequence with every character.

For overshot, the sequences must have alternating parity [1], and appending one sequence to another must preserve this property. Thus, all sequences must start with a number of the same parity and end with a number of the opposite parity — and hence have an even number of terms. And, to avoid ambiguities, all sequences must be of the same length.

Consider the simple case in which only the 26 uppercase characters are used. For four shafts, each sequence must have six terms. There are $2^6 = 64$ such sequences, choosing an odd number to begin. (The choice of an odd beginning number is arbitrary; an even number would work just as well.) Although only 26 sequences are needed, there are only 2^4=16 four-term such sequences, which is not enough.

Here is a code table in which 26 of the possible 64 sequences have been chosen at random.

letter	*sequence*
A	3,2,3,2,1,4
B	1,2,1,2,1,4
C	1,2,3,4,1,2
D	1,4,3,4,3,2
E	1,4,1,2,1,2
F	1,2,3,2,1,4
G	3,2,3,4,3,2
H	3,4,1,2,1,4
I	1,4,3,4,1,4
J	3,2,1,4,1,4
K	1,4,1,4,1,4
L	3,2,1,2,1,4
M	3,4,1,2,3,4
N	1,2,3,4,1,4
O	3,4,3,2,1,4
P	3,2,3,2,3,2
Q	1,2,1,4,1,4
R	3,4,1,2,3,2
S	3,4,3,4,3,4
T	1,4,1,2,3,2
U	3,2,1,4,1,2
V	1,2,3,2,1,2
W	3,2,1,2,3,2
X	1,2,1,2,1,2
Y	1,4,3,2,1,4
Z	1,4,3,2,1,2

The sequence for TRANQUILITY is

1,4,1,2,3,2,3,4,1,2,3,2,3,2,3,2,1,4,1,2,3,4,
1,4,1,2,1,4,1,4,3,2,1,4,1,2,1,4,3,4,1,4,3,2,
1,2,1,4,1,4,3,4,1,4,1,4,1,2,3,2,1,4,3,2,1,4

A weave for this sequence is shown at the end of this article.

The message can be extracted from the weave by fabric analysis [5], but a lot of auxiliary information is needed: the table code table, the tie-up used, how the threading sequence is use (as-is or reflected, for example, and the treadling sequence. This is something to be done with a program, not by hand.

The problems with message drafting lie in the ponderous code table, of which there are many possible, and the length of the sequence produced for even short strings — six times the number of characters in the string. The first problem can be handled by a program. The second is inherent.

Comment

In the context of cryptography, message drafting is a form of enciphering. The context is unconventional (but not unique): a textile design rather than written material.

Should message drafting become popular, it could add a new meaning to the term *dress code*.

References

1. *Code Drafting, Part 1: Introduction*, Ralph E. Griswold, 2004: http://www.cs.arizona.edu/patterns/weaving/webdocs/gre_cd1.pdf

2. *Code Drafting, Part 2: Balanced Code Tables*, Ralph E. Griswold, 2004: http://www.cs.arizona.edu/patterns/weaving/webdocs/gre_cd2.pdf

3. *Code Drafting, Part 3: A Larger Character Set*, Ralph E. Griswold, 2004: http://www.cs.arizona.edu/patterns/weaving/webdocs/gre_cd3.pdf

4. *Code Drafting, Part 4: Adaptive Tables*, Ralph E. Griswold, 2004: http://www.cs.arizona.edu/patterns/weaving/webdocs/gre_cd4.pdf

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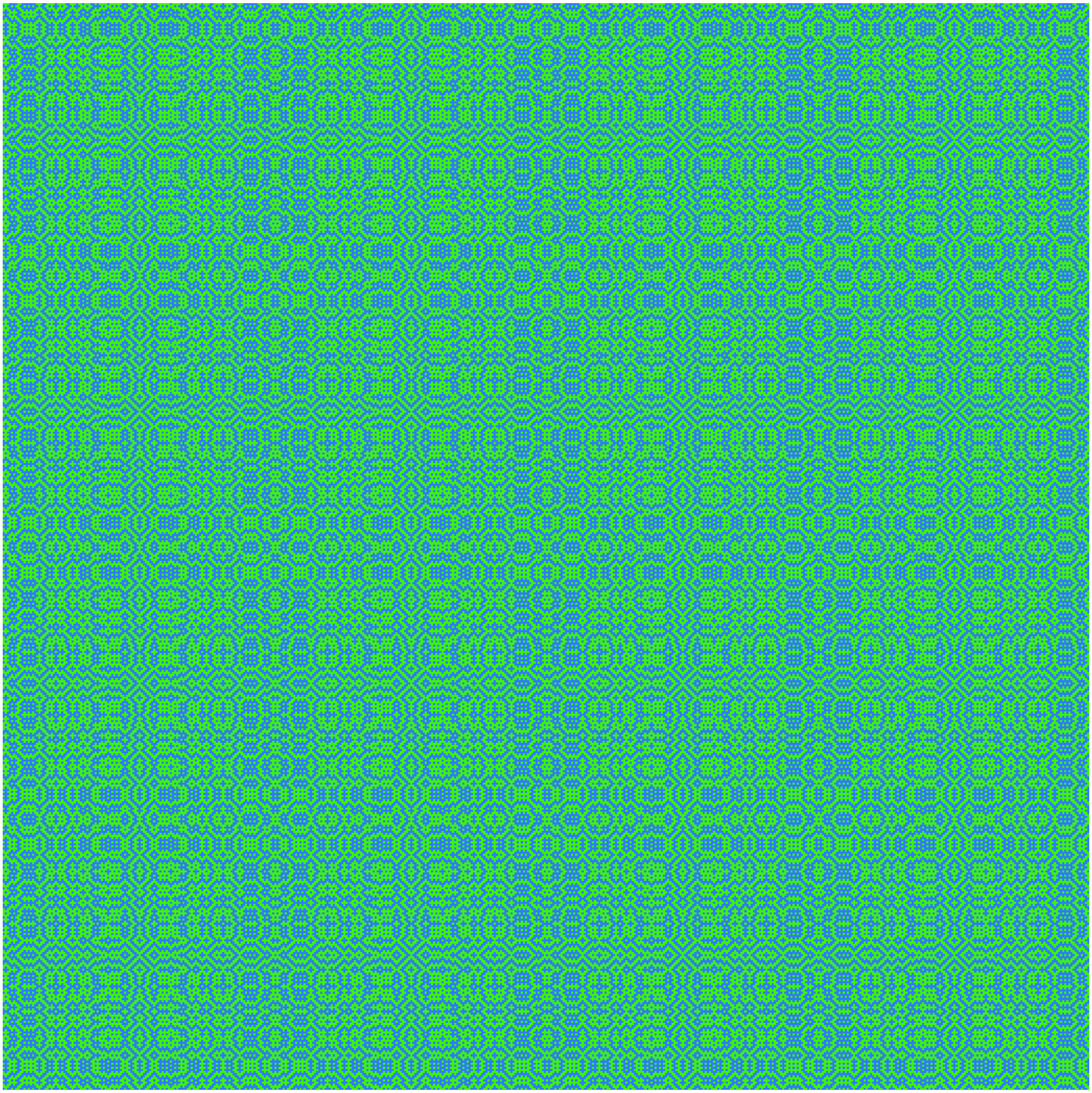

Tranquility